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No. 79-1112

In the Supreme Court of the United States

OCTOBER TERM, 1979

SIDNEY A. DIAMOND, COMMISSIONER OF PATENTS AND TRADEMARKS, PETITIONER

v.

JAMES R. DIEHR, II, AND THEODORE A. LUTTON

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

BRIEF FOR THE PETITIONER

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BRIEF FOR THE PETITIONER

OPINIONS BELOW

The opinion of the Court of Customs and Patent Appeals (Pet. App. la-18a) is reported at 602 F.2d 982. The opinion of the Patent and Trademark Office Board of Appeals (Pet. App. 20a-25a) and the opinions of the patent examiner (Pet. App. 26a-37a) are not reported.

JURISDICTION

The judgment of the Court of Customs and Patent Appeals was entered on August 9, 1979, and a timely

petition for rehearing was denied on October 18, 1979 (Pet. App. 19a). The petition for a writ of certiorari was filed on January 16, 1980, and granted on March 17, 1980 (J.A. 3). The jurisdiction of this Court is invoked under 28 U.S.C. 1256. *Gottschalk* v. *Benson*, 409 U.S. 63 (1972); *Dann* v. *Johnston*, 425 U.S. 219 (1976); *Parker* v. *Flook*, 437 U.S. 584 (1978).

QUESTION PRESENTED

Whether a computer program that regulates the curing time of rubber products in a mold is patentable subject matter under 35 U.S.C. 101.

STATUTE INVOLVED

35 U.S.C. 101 provides:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

STATEMENT

On August 6, 1975, respondents James R. Diehr and Theodore A. Lutton applied for a patent on a process using a computer for regulating the curing time of rubber products in a mold press (Pet. App. 38a, 41a).[1]

Rubber products produced in a mold press are cured in the press for a specified time (Pet. App. 39a–40a). The time needed to obtain a good cure depends in part on the temperature inside the press, which is regu-

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[1] The invention is assigned to Federal-Mogul Corporation, Detroit, Michigan (Br. in Opp. 6).

lated by a thermostat (*ibid.*).[2] It is possible, using well-known time, temperature, and cure relationships, to calculate when to open the press and remove the cured product (*id.* at 39a, 49a). Nonetheless, uncontrolled variables present in the actual curing process make it difficult to determine accurate temperatures for purposes of doing the necessary computations. The time the press is opened while it is being loaded, for example, affects the temperature inside the press when it is first closed and thus influences the time it takes to heat the press to the desired temperature (*id.* at 39a). For this reason, industry practice is to calculate the cure time as the shortest time in which all parts of the product definitely will be cured, assuming a "reasonable amount of mold-opening time" during loading and unloading (*id.* at 40a). The disadvantages of this practice are that erring on the side of caution will usually lead to overcuring the rubber, while keeping the mold open for more than a "reasonable" time will often result in undercuring (*ibid.*).

Respondents' claimed invention employs a digital computer to overcome these drawbacks. Measurement of the temperature in the closed, heated press is made "continuously," for example, every ten seconds (Pet. App. 41a). These measurements are automatically fed into the computer (*id.* at 41a, 45a). For each new measurement, the computer recalculates the cure time in accordance with a well-known mathematical formula, the Arrhenius equation (*id.* at 41a–42a, 46a).

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[2] The geometric configuration of the press and the viscosity of the rubber when it enters the press are also important factors in computing the cure time (Pet. App. 46a–47a, 48a, 49a).

When the recalculated cure time equals the actual time that has elapsed since the press was closed, the computer signals a device to open the press (*id.* at 42a, 45a). Respondents' claims describe both the method for operating the press using the computer and, more generally, the method for manufacturing molded articles, including the steps of putting rubber into the press, closing and heating the press, and opening the press to remove the molded product (*id.* at 44a-62a).

The patent examiner rejected the invention as drawn to nonstatutory subject matter under 35 U.S.C. 101 (Pet. App. 26a-37a). He concluded that those steps in respondents' claims that are "carried out by the computer under control of a stored program" constitute nonstatutory subject matter under *Gottschalk* v. *Benson*, 409 U.S. 63 (1972) (Pet. App. 28a, 33a-34a). The remaining steps—which relate generally to the method of manufacturing precision molded articles, such as to the opening, closing, and heating of the mold—the examiner found to be conventional (*id.* at 28a, 33a).

The Patent and Trademark Office Board of Appeals unanimously affirmed the rejection. The Board found that respondents' specification, while not listing a computer program as such, in fact contained a sufficient description from which a person of ordinary skill in the art could write a computer program (Pet. App. 21a-22a). Analyzing the claims, the Board found much that was either within the prior art, such as the constant measurement of the mold temperature, or that involved post-solution activity, such as the automatic opening of the press. The calculation recited in the

claims, observed the Board, shows that respondents' system employs an algorithm (*id.* at 22a–24a). The Board summarized: "[t]he only difference between the conventional methods of operating a molding press and that claimed * * * rests in those steps * * * which relate to the calculation incident to the solution of the mathematical problem or formula" (*id.* at 24a). The Board concluded that this calculation, respondents' "contribution," was a computer program of the kind that is nonstatutory under *Benson*, *supra*, and *Parker* v. *Flook*, 437 U.S. 584 (1978) (Pet. App. 24a).

The Court of Customs and Patent Appeals reversed. It agreed with the Board that the applicants had "disclosed a computer program" (Pet. App. 5a n.3), but it stated that this "does nothing to aid in the determination of compliance with § 101" (*id.* at 8a) and is not "of any significance" (*id.* at 14a). It held that this Court's analysis detailed in *Flook* was merely "a convenient vehicle" for finding the method of calculation in that case to be nonstatutory, and did not establish "a general test in determining compliance with § 101" (*id.* at 13a–14a n.6). Thus it refused to identify and set aside, as had the Board, those steps in the claim that were old in the art (*id.* at 13a–14a, 16a–17a), stressing that "[c]onsiderations of novelty and obviousness have no bearing on compliance with § 101" (*id.* at 13a). The court instead considered the claims "*as a whole*" (*id.* at 13a–14a, 15a) and found that they recite "a process or method for molding rubber articles" (*id.* at 15a), at whose "heart" is a molding press, not an equation or method of calculation (*id.* at 16a). Since this "process" constituted "an improvement over prior processes"

(*id.* at 15a) themselves patentable subject matter, the court below concluded that respondents' "process" was likewise patentable (*id.* at 15a–18a).

SUMMARY OF ARGUMENT

This case differs from *Parker* v. *Flook*, 437 U.S. 584 (1978), in no significant way. In both cases, applicants seek to patent a process the only novel feature of which is an algorithm embodied in a computer program. The primary difference between the two cases is in the manner in which the claims have been drafted: although Flook's claims focused on the algorithm and recited only minor post-solution activity, the claims here recite in general terms the entire conventional rubber molding process. That difference does not justify a different result—*Flook* was an interpretation of the scope of Section 101, it was not a guide to the drafting of claims.

ARGUMENT

THIS CASE IS NOT MEANINGFULLY DISTINGUISHABLE FROM *PARKER* v. *FLOOK*: LIKE THAT CASE, IT INVOLVES PROCESS CLAIMS THAT RECITE UNPATENTABLE SUBJECT MATTER

Parker v. *Flook*, 437 U.S. 584 (1978), involved claims to a computerized method of updating alarm limits in catalytic conversion processes whose only advance over conventional methods resided in a novel formula. See *Parker* v. *Flook*, *supra*, 437 U.S. at 585–586, 594. The Patent Office rejected the claimed invention on the basis that it was for a formula or algorithm that was unpatentable. *Id.* at 587. Emphasizing that the process claims "[did] not preempt the for-

mula or algorithm contained therein," the Court of Customs and Patent Appeals held that the claims were patentable under 35 U.S.C. 101. *In re Flook*, 559 F.2d 21, 23 (C.C.P.A. 1977). This Court reversed. It found the fact of the formula's nonpreemption immaterial (*Parker* v. *Flook*, *supra*, 437 U.S. at 589–590, 593), stressing instead the importance of determining initially "what type of discovery is sought to be patented" (*id.* at 593). To accomplish this, the Court first assumed the "algorithm * * * to be within the prior art" (*id.* at 594). Taking what remained in "the application, considered as a whole," the Court determined that all else was "well known" (*ibid.*).[3] Hence, the "application contain[ed] no claim of patentable invention" (*ibid.*).

This case is *Flook* revisited. The Board properly set aside the algorithm[4] in the claims, embodied in a computer program, finding it nonstatutory (Pet. App. 24a).[5] Since the computer program was respondents' sole "contribution" (*ibid.*), the remaining steps of re-

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[3]This included the "chemical process involved in catalytic conversion * * *, the practice of monitoring the chemical process variables, the use of alarm limits to trigger alarms, the notion that alarm limit values must be recomputed and readjusted, and the use of computers for 'automatic monitoring-alarming'" (*ibid.*).

[4]For definitions of "algorithm" and other technical terms used in this brief we refer the Court to our brief in *Diamond* v. *Bradley*, No. 79–855, to be argued in tandem with this case (J.A. 3). We are sending respondents a copy of our brief in *Bradley*.

[5]The Board was correct in treating the programmed algorithm as nonstatutory. See *Parker* v. *Flook*, *supra*, 437 U.S. at 594; Brief for Petitioner in *Diamond* v. *Bradley*, No. 79–855, at 11–19.

spondents' method being "conventional" or "post-solution in character" (*ibid.*; see Pet. App. 28a, 33a), the Board correctly concluded that the claims recited nonstatutory subject matter.

Respondents do not now dispute that, as the Board found, the following steps in their claims are well-known: (1) putting unmolded synthetic rubber in the molding press cavity; (2) closing the press; (3) opening the press; and (4) removing the article (Pet. App. 24a). Indeed, the only step of their method which they contend is novel is the one of continually measuring the temperature in the mold cavity (Br. in Opp. 7). The Board found, however, that this step was old (Pet. App. 24a), and the court below left the Board's determination standing (*id.* at 13a).[6]

Respondents argue (Br. in Opp. 7) that the Board's finding is wrong, but they have been unable to show clear error. In fact, ample evidence supports the Board's finding. Prior patents, cited by the examiner here (Pet. App. 30a), identify this step. Thus, in a patent issued to Gould and Davis on February 27, 1973, the inventors described a "method of controlling the state of cure" that involved in part "locating a temperature sensing probe at a predetermined site within the article, * * * monitoring the local temperature of said site as a function of time, computing therefrom the total state of cure of said part of the article as a func-

[6] Respondents imply that the court below decided this factual issue in their favor (Br. in Opp. 7). This is not so, however. It is true that the CCPA observed in passing that on this point it was "inclined to agree with appellants" (Pet. App. 13a). But the court did not reverse the Board because it found the issue had no "relevance" to a Section 101 inquiry (*ibid.*).

tion of time, and terminating the heat supply when a predetermined state of cure has been reached" (*id.* at 64a–65a).[7] The computation employed the Arrhenius equation (*id.* at 59a) and Gould and Davis suggested using "a digital computer" to monitor and calculate the state of the cure at "set intervals" (*id.* at 67a).[8] In an earlier application, Davis and Gould described a similar method using "a computer device" to determine the state of cure at time intervals by sensing the temperature "at at least two boundary surfaces of the article" (*id.* at 75a, 77a).[9] In neither patent specification, however, did the inventors provide a flow chart from which a computer program could be written, or the computer program itself.[10]

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[7] The specification noted that the mold could be opened automatically "by actuation by the computer of a suitable device" (Pet. App. 68a).

[8] Claim 1 specifies one-minute intervals; claim 7 is more general referring to "regular intervals" (Pet. App. 71a, 72a). As an alternative the inventors proposed monitoring temperature "as a continuous function of time" and recomputing the change in cure state "at every instant" (*id.* at 67a–68a).

[9] It can be important with precision molded products, such as those produced by the process described by respondents, that the temperature sensing device leave no imperfection in the rubber. Hence, the device is not inserted into the rubber itself, but instead reads the temperature at the surface of the rubber article.

[10] A 1972 patent granted to Neugroschl, also cited by the examiner here (Pet. App. 30a), described the use of a digital computer to monitor the rubber curing process continuously and to compare the data obtained "against pre-determined stored acceptable ranges of values" (U.S. Patent No. 3,659,974 to Neugroschl, patented May 2, 1972, filed Aug. 6, 1968 at 1). Neugroschl's specification included a computer program with

Thus respondents' only inventive contribution, if there is one at all, is in actually programming the computer to control the already-known rubber molding process.[11] That is how the Board treated respondents' application (Pet. App. 24a). The Board recognized that since respondents' contribution was limited to the program and did not claim an improvement in the process itself, the case was indistinguishable from *Parker* v. *Flook*, *supra* (*ibid.*). There, as here, the application claimed the continuous measurement of a process variable, a programmed recomputation using a mathematical formula, and an adjustment based upon that recomputation. *Parker* v. *Flook*, *supra*, 437 U.S. at 585–586.[12] The Board, following the *Flook* analysis, recognized that *Flook* controls this case.

The court below refused, however, to apply *Flook*, summarily dismissing it on the basis that this Court never "meant to establish that analysis as a general test" (Pet. App. 14a n.6). Thus, the CCPA did not

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which to carry out his invention (*id.* at 4). He did not, however, contemplate programming the computer to recompute the actual cure time and then to direct machinery to open the mold at the appropriate moment. We are lodging a copy of the Neugroschl patent with the Clerk of this Court.

[11] Respondents admit that their "application contains flow sheets from which a competent programmer can set up a program" (Br. in Opp. 7) but maintain that strictly speaking "the application does not disclose a computer program" (*ibid.*). In fact, as noted by the Board (Pet. App. 22a), respondents filed an amendment that attached an actual program written in Fortran (see our brief in *Diamond* v. *Bradley*, *supra*, page 7, note 4) from respondents' specification (App. *infra*, 18–19).

[12] Flook's method was if anything more novel than respondents'. He at least employed a novel formula (*Flook*, *supra*, 437 U.S. at 585–586); respondents' formula is old. Neither Flook nor respondents would preempt all use of the formula claimed.

identify respondents' computer program as the only novel feature of their invention (*id.* at 13a-14a), but focused instead on the claims "*as a whole*" (*ibid.*)—in accordance with the approach of the dissenting opinion in *Flook* (437 U.S. at 599-600). It concluded that, when so viewed, respondents' claims were not essentially for a method of calculation or formula (Pet. App. 14a) but for an improved process (*id.* at 15a-16a). Accordingly, the court held that they recited statutory subject matter.

The decision below comports with the CCPA's persistent criticism of *Flook* (see, *e.g.*, *In re Bergy*, 596 F.2d 952, 966 (1979)) and effectively confines *Flook* to its own facts. But nothing in the *Flook* opinion justifies reading the decision so narrowly.[13] *Flook* does not suggest that this Court's analysis was, as the CCPA would have it, merely "a convenient vehicle to highlight the fact that Flook's actual contribution to the useful arts was his new formula" (Pet. App. 13a n.6). On the contrary, there was no dispute that the formula was Flook's sole contribution; it was assumed to be so. *Flook*, *supra*, 437 U.S. at 588. The critical point is that the discovery of the programmed algorithm could not support Flook's patent unless there was "some other inventive concept in its application." *Id.* at 594. Here, too, since the programmed algorithm is respondents' only contribution, there being nothing else original in the claims, they should have been rejected by the CCPA on the authority of *Flook*.

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[13] Certainly, the dissenting Justices in *Flook* did not read the Court's opinion as being so limited. See *Parker* v. *Flook*, *supra*, 437 U.S. at 599.

The court below found it significant that respondents' claims "recite a process involving the manipulation of apparatus" while the *Flook* claims "recite nothing but the calculation, coupled with the post-solution activity consisting only of updating an alarm limit" (Pet. App. 17a).[14] But *Flook* cannot be read as turning on the manner in which the claims were drafted. Indeed, the Court there rejected a similar attempt to distinguish that case from *Benson* on the ground that the claims in *Flook* had been drafted to include "post-solution activity" in addition to the algorithm (437 U.S. at 590; footnote omitted):

> The notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable

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[14] In its recent opinion in *In re Walter*, 205 U.S.P.Q. 397, 406, 410 (C.C.P.A. 1980), the CCPA reiterated its interpretation of *Flook*, but nonetheless affirmed the Board's rejection of method claims to a programmed algorithm for cross-correlating seismic signals, finding that they were essentially for a mathematical algorithm. 205 U.S.P.Q. at 408–409. In *Walter* the CCPA attempted to distinguish the instant case on the basis that respondents' contribution involved "refining and further defining" a step of the rubber molding process. But whatever "refinement" respondents brought to the process resulted from the programmed algorithm and not from any new method for curing rubber products. Indeed, we see no material difference between the *Walter* method claims and the claims in the instant case, even under the CCPA's approach. Here, as in *Walter*, the specification describes certain apparatus in a general way, but the programmed algorithm is useful in "widely differing embodiments and applications" (Pet. App. 52a; compare 205 U.S.P.Q. at 408–409). Thus, just as the *Walter* claims set forth "the environment in which the improvement operates" (205 U.S.P.Q. at 409), here the "disclosures and the description * * * are purely illustrative" and were "not intended to be in any sense limiting" (Pet. App. 52a).

> process exalts form over substance. A competent draftsman could attach some form of post-solution activity to almost any mathematical formula; the Pythagorean theorem would not have been patentable, or partially patentable, because a patent application contained a final step indicating that the formula, when solved, could be usefully applied to existing surveying techniques. The concept of patentable subject matter under § 101 is not "like a nose of wax which may be turned and twisted in any direction . . . ." *White* v. *Dunbar*, 119 U.S. 47, 51.

For precisely the same reason, the fact that respondents' application recites in general terms the existing rubber-molding process does not transform his unpatentable principle into a patentable process.

CONCLUSION

For the foregoing reasons, the judgment of the Court of Customs and Patent Appeals should be reversed.

Respectfully submitted.

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JUNE 1980

APPENDIX

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APRIL 19, 1976

In the Application of

JAMES R. DIEHR, II AND THEODORE A. LUTTON

Serial No. 602,463

Filed August 6, 1975

FOR DIRECT DIGITAL CONTROL OF RUBBER MOLDING PRESSES

Group Art Unit 236

Examiner: Joseph F. Ruggiero

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

AMENDMENT

In response to the Official Action of January 26, 1976, please amend the application as follows:

* * * * *

REMARKS

The Examiner is thanked for having graciously held an interview with Applicants' Attorney, Robert E. Wickersham, on March 24, 1976, with Joseph D. Ekland (Manager, Manufacturing Systems, Manufacturing Engineering Services of the Assignee) and Jay Cantor (Mr. Wickersham's Washington Associate) present.

The application and the Office Action of January 26, 1976, were discussed. As the objection and rejection under 35 U.S.C. 112 were discussed, and Mr. Ekland took notes on the proper substance of an affidavit to rebut the objections noted. The enclosed Affidavit is the result, and it is believed that it shows that the application does disclose quite sufficient material to enable one skilled in the art to carry out the invention. Therefore, it is believed that the application does comply with 35 U.S.C. 112.

* * * * *

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of

JAMES R. DIEHR, II and THEODORE A. LUTTON

Serial No. 602,463

Filed: August 6, 1975

For: DIRECT DIGITAL CONTROL OF RUBBER MOLDING PRESSES

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

AFFIDAVIT

I, Joseph D. Ekland, being first duly sworn, depose and say:

* * * * *

9. THAT I am familiar with Fig. 3 A & B of the above identified application;

10. THAT from these figures and the written specifications of the above application, a reasonably skilled programmer would have no difficulty in preparing a computer program in any of the standard computer languages for use in any standard computer of suitable capacity;

11. THAT I feel the project estimate given by Mr. James R. Diehr II and Theodore A. Lutton in their Rule 132 Affidavit dated 6 March 1975 and submitted with application amendment of August 5, 1975 is a fair and accurate estimate:

12. THAT to support the aforegoing statements (9, 10, 11) I furnish the following narrative which such a programmer might first prepare, and an example of this program as translated into FORTRAN.

FLOWCHART NARRATIVE (REF: Fig. 3-A)

11) Hardware timer interrupts system and starts scan cycle.

12) Data on press status and analog temperature data read into press.

21) Test input bit switch to determine if press is closed. If yes, go to 31). If no, go to 41).

31) Add ΔT time to accumulator associated with this press.

32) Fetch thermocouple data on temperature of this mold.

33) Calculate V=Antilog N (C*Z+X) where Z is value from 32) and C and X are constants.

34) Compare V with accumulator in step 31). If yes, go to 35). If no, go to 41).

35) If closure time (accumulator) were greater, open press.

41) Calculate $e = \frac{\text{set point—measured value}}{\text{dead band}}$ and truncate at the decimal point.

42) If e has a value >1, go to 43). If not, go to 51).

43) Test e = SP-MY for sign.
If negative turn heater off.
If positive turn heater on.

51) Test A switch to determine if there is a batch data entry.
If yes, go to 52).
If no, go to 61).

52) Calculate batch Arrhenius Constant C for the equation $C = \frac{\text{Ln } V - X}{Z}$ and store with compound and batch numbers.

61) Check status word for Console Interrupt. If interrupt switch is Positive, go to 62). If negative, proceed to 71).

62) Identify incoming data by press number and store data in press record location.

71) Check present press record number with press record end pointer. If press record number equals end pointer, go to 73). If press record number does not equal end pointer, go to 12).

A general FORTRAN type program to indicate method (not including dimension statements, etc.):

```
40      Enter  N = 0
50             N = N +1
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100          Call DI (IDA(N), IDI(N) )
             Call AIS (6, IAIS(N))
             IF (IDI(N)) 200, 400, 400
200          IACUMT(N) = IACUMT(N) - IDLT
             IZ = CALL TEMCON (IAIS(N))
              Z = CALL FLOAT (IZ)
              V = CALL EXP(C * Z + X)
             IV(N) = CALL FIX (V)
             IF (IACUMT (N) - IV(N)) 300, 400, 40
300          CALL DO (IDOA(N), IDO (N) )
400          IE - (ISP(N) - IMV(N)/IDB(N)
             IF (IE) 500, 600, 700
500          CALL DO (IDOC(N), IDO1)
             GO TO 600
700          CALL DO (IDOC(N), IDO2)
600          IF (IB) 800, 900, 900
800          TEMP = CALL LOG N (V)
             C = (TEMP - X)/Z
900          IF (IC) 10, 20, 20
 10          CALL DISPLAY SUBROUTINE
 20          IF(N - I LAST) 30, 30, 40
 30          CALL EXIT
```

Further affiant saith not.

/s/Joseph D. Ekland

JOSEPH D. EKLAND

Subscribed and sworn to before me this 14th day of April, 1976.

/s/SHARON MANDO
Notary Public
Wayne County, Mich.
Acting in Oakland County, Mich.
My Commission expires: Aug. 23, 1977